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**SUBJECT:** Annual Progress Report: Establishment of Vegetation Monitoring Plots, Elmendorf Air Force Base, Alaska

(Contract Agreement No. DAMD17-99-2-9004)

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**DATE:** December 15, 1999

The following information is provided as an Annual Progress Report for a project to establish and characterize long-term vegetation monitoring plots on Elmendorf Air Force Base, Alaska. If you have any further questions or comments, after reviewing this document, please call me at (907) 257-2787 or contact me via email at [angft@uaa.alaska.edu](mailto:angft@uaa.alaska.edu).

### Description of Work

In January 1999, the Alaska Natural Heritage Program (AKNHP) undertook a project to establish and characterize long-term vegetation monitoring plots (LTVMPS) on Elmendorf Air Force Base (EAFB), Alaska, under Contract Agreement No. DAMD17-99-2-9004. The purpose of the project is to provide information necessary to monitor long-term changes and update the EAFB Integrated

Natural Resource Management Plan (INRMP) as directed in AFI 327064 and 32 CFR 190.7, 16 USC5CSCI670a (Sikes Act). These documents require military installations to develop new, integrated, natural resource plans and make substantive revisions at least every five years. The current EAFB vegetation inventory is 15 years old and does not reflect current vegetation conditions.

The proposal called for the establishment of long-term plots to satisfy a significant portion of the INRMP data requirements by developing the means for periodically monitoring and updating the natural resource information database rather than conducting an intensive base-wide inventory similar to the 1983 study. The current approach establishes a system of permanent vegetation monitoring plots to supply essential information leading to a better understanding of ecosystem health and functioning. Through an integrated approach, data gathered in this effort will also supply supportive information for the management of wildlife, forest resources, threatened and endangered species, outdoor recreation resources, and protected wetlands.

The proposal called for the development of a Vegetation Monitoring Implementation Plan (VMIP) outlining the design, establishment, and baseline description procedures for a system of long-term vegetation inventory plots. In addition to the VMIP and the establishment and characterization of LTVMPs, a rare plant inventory, and collection of additional vegetation plot data from within monitored vegetation types and select early successional vegetation types was to be conducted. The objective of the latter was to provide information leading to a better understanding of Base botanical resources, and vegetation dynamics in response to both natural and human-induced processes such as succession and disturbance (climate change, fire, forest insect predation). The project's final report, scheduled for completion in 2000, will include the VMIP and an analysis and discussion of the baseline data.

### **Progress To Date:**

#### **Vegetation Monitoring Implementation Plan (VMIP)**

A principal objective of the project was the preparation of a "Vegetation Monitoring Implementation Plan" (VMIP) identifying and developing survey methodologies and field sampling techniques. AKNHP drew on its broad expertise in the fields of plant taxonomy, botanical survey methods, plant community delineations, statistical sampling, data base construction and Geographic Information Systems (GIS), to develop and complete a scientifically sound vegetation monitoring methodology.

The draft VMIP was completed in June 1999, and reviewed by the appropriate authorities in the field of plant conservation mutually agreed upon by EAFB Natural Resources staff and AKNHP. The VMIP methodology was subsequently field tested and implemented beginning June 15, 1999.

The completed VMIP and all field data sampling forms are available for viewing at the following proprietary AKNHP website established for this purpose:

< [http://www.uaa.alaska.edu/enri/aknhp\\_web/projects/efb.html](http://www.uaa.alaska.edu/enri/aknhp_web/projects/efb.html) >

Briefly, the VMIP considered available information, including the original 1983 inventory and vegetation map, a Base wetlands map, 1997 soil survey, 1998 vegetation map, previous ground-truthing data and a Base land-use constraints map. AKNHP reviewed and integrated the considerations of methodologies from various natural resource fields, including plant ecology, forestry (e.g. wildlife management, wildlife habitat evaluation procedures (HEP), neo-tropical migrant bird studies), climate change, and conservation biology. The VMIP also addressed compatibilities of the proposed methodology with the EAFB conservation program and existing

cooperating agency data.

The VMIP specifically details the design, layout and monumenting of permanent sample plots. It also provides the sampling procedures to be implemented at each permanent plot or any other supplemental plots designated in the sampling design, and includes copies of all field data sampling sheets used in the project in 1999, and to be used in subsequent years. The VMIP provides a statistical foundation for the collected sample data, assuring that the resulting data maintain statistical validity. Detailed methods are provided for plot data collection, and directional notes and photo documentation to assure future access and relocation of the LTVMPs.

### **Field Investigations:**

#### **Establishment and Characterization of Monitoring Plots**

Implementation of the VMIP and field work for the project was carried out between June 15 and October 15, 1999. Thirty long-term vegetation monitoring plots (LTVMPs) were established. Twenty four of these were fully monumented and fully characterized for a baseline assessment of vegetation change. The remaining six were surveyed in, monumented, and recorded so that Base Natural Resource personnel could characterize them at a later date.

Monitoring plots were established in major vegetation types identified in the original 1983 vegetation inventory. The breakdown is as follows (number of fully characterized plots in parentheses):

- 12 (9) Old -Growth White Spruce/Mixed Forest
- 3 (3) Black Spruce Forest
- 4 (3) Young Birch Forest
- 5 (3) Young Mixed Birch/White Spruce Forest
- 3 (3) Alder Shrub
- 3 (3) Bluejoint Grass Meadow

Monitored plots represent all major vegetation types greater than 300 acres plus a Bluejoint Grass Meadow type identified and agreed upon in Phase I discussions of the project with EAFB Natural Resource staff. The LTVMPs were located away from areas of anticipated future disturbance and distributed to represent the various site types on the Elmendorf moraine and ground moraine. AKNHP staff believe that this number is adequate and representative for long-term monitoring.

#### **Additional Vegetation Characterization Data Collection**

In addition to the establishment of the 30 LTVMPs, 172 vegetation plots were completed to characterize the variability of plant community types within the major monitored vegetation types.

A survey was also begun to characterize areas where alder is considered a normal ecosystem component from areas where the species is considered "invasive" due to changes in ecosystem conditions. Alder sites were sampled across the Base identified from 1983 and 1998 vegetation maps, and supplemented with airphoto

interpretation of 1993 color-infrared photography. Sixty plots were completed to meet the beginning needs of the alder project. The alder project will be continued into summer 2000 based on analyses of summer 1999 data, and supplemental funding received in September 1999.

### **Botanical Survey**

Field surveys for vascular plants were conducted between July and September of 1999. The primary goal of the botanical survey was to document vascular plants not previously known from the Base, with particular emphasis on any rare plants that might occur on the Base. (Rare plants were defined as those ranked S3 or rarer by the AKNHP.)

We compiled a preliminary list of plant taxa that were either already known from the Base or that could be expected to occur based on known herbarium collections from adjacent areas. This list was used to highlight particular habitats to search for taxa not yet known from the Base. Bluffs and fresh water and estuarine wetlands received special attention as likely sources for range extensions. Additional transects were added to provide adequate baseline coverage of other vegetation types and several LTVM plots were surveyed. Voucher specimens were made of critical taxa and significant range extensions. No vouchers were made for new records of common taxa known from adjacent areas on Fort Richardson.

No plants listed as Endangered or Threatened by the US F&WS or as Sensitive by the US Forest Service were found, nor were any plants found that were previously listed as Category 2 candidates by the US F&WS. Approximately 70 taxa new to the Base were recorded including several plants ranked S3 and at least one significant range extension. Several critical taxa require further study for definite determination.

### **Synthesis, Analysis and Archiving of Monitoring Data**

The organization and clean up of the summer field data has been ongoing since the end of the field season and the return of staff from annual leaves in October. We anticipate this to be completed by January 15, 2000.

A large first phase of this endeavor completed in November involved the laboratory identification and verification of unknown plant species collected on the LTVM sites over the summer. These have been summarized and are currently being entered to the data records for each LTVM plot and vegetation characterization plot prior to database entry.

The photo archiving of approximately 1800 slides is 90 percent complete. This is a very large undertaking but a necessary one for long-term monitoring studies. All slides and prints are numbered and referenced to a Photo Log Record and verified in the LTVMP field data sheets. All slides will ultimately be grouped to LTVM Plot or other project objective.

Data Management staff have begun preparing the initial ArcInfo/ArcView data layer of the LTVMP locations. We would like to have this base layer completed soon so that LTVM plot locations can become part of any of the Base's landuse planning processes.

A Homestead History Map has been completed as it relates to the LTVMP project and vegetation characterization portion of the contract. It will be used for reference in the determination of potential disturbance history or starting dates of LTVM plots or vegetation characterization plots. At this time, it appears that some plots occur within homestead boundaries; however, no plots appear to

occur on homesteads that were "proven up on", and that consequently had vegetation disturbance such as forest removal or grazing.

Early in the project, a vegetation classification cross-walk was completed linking the 1983 EAFB mapping classification (which was based on a 1982 draft state-wide classification) to the currently recognized state-wide classification of Alaska vegetation authored by Viereck, Dyrness, Batten and Wenzlick (1992). Although not recognized formally as part of the monitoring project, this very flexible, interactive GIS attribute table was completed to be presented to CSU for incorporation into the 1983 digitizing map effort, and proved very useful in assisting in the location of permanent plots in major vegetation units, and identifying sites for the alder study.

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